UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 84505

CSAH NO. 14

OVER THE

OTTER TAIL RIVER

DISTRICT 4 - WILKIN COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 58)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 84505, Piers 1 and 2, were found to be in good condition with no structurally significant defects observed. Minor accumulations of branchy timber debris were observed around both piers with a moderate accumulation of drift also at the downstream end of Pier 2. An area of section loss was observed on Pier 1 where some timber formwork was embedded into the face of the concrete pier cap. The channel bottom appeared stable with no appreciable changes since the previous inspection.

INSPECTION FINDINGS:

(A) A minor accumulation of branchy timber debris, with pieces up to 3 inches in diameter, along with some minor steel debris was observed on the channel bottom at the upstream end of Pier 1 and extending along the north side of the pier.

(B) Minor accumulations of branchy timber debris were observed all around Pier 2 with a moderate accumulation of larger timber debris, with pieces up to 12 inches in diameter, observed at the downstream end of the pier.

(C) The concrete pier cap exhibited timber formwork embedded into the south face at Pier 1 with an area of concrete section loss observed along the formwork which was 2.5 feet long, 1 foot wide, and 4 inches deep.

RECOMMENDATIONS:

(A) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 84505

Feature Crossed: Otter Tail River

Feature Carried: CSAH No. 14

Location: District 4 - Wilkin County

Bridge Description: The superstructure consists of a three span multiple steel beam structure supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two concrete-filled, steel shell pile bent piers. The abutment footings are supported on piles. The piers are labeled 1 and 2 starting from the west end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: Denis Redzic, Valerie Roustan

Date: September 17, 2007

Weather Conditions: Cloudy, 62°F

Underwater Visibility: 2.0 feet

Waterway Velocity: 2.0 fps

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: Piers 1 and 2 consist of a deep, rectangular reinforced concrete cap connecting a single row of nine concrete-filled steel shell piles.

Maximum Water Depth at Substructure Inspected: Approximately 2.5 Feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the downstream end of Pier 1.

Water Surface: The waterline was approximately 8.6 feet below reference.
Waterline Elevation = 964.2.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/09/07

Item 113: Scour Critical Bridges: Code U/96

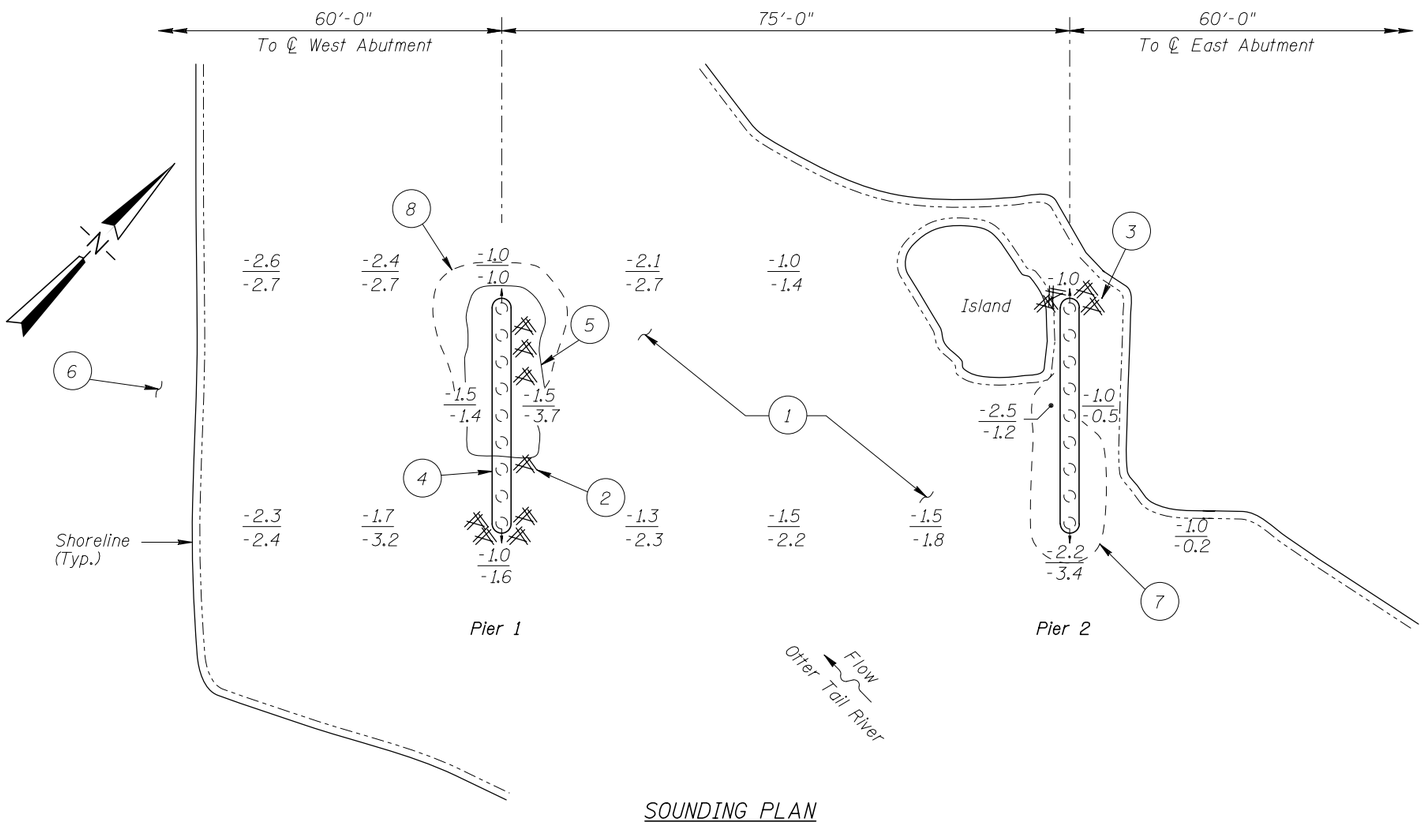
Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

X Yes _____No

Photograph 1. Overall View of the Structure, Looking North.

Photograph 2. View of Pier 1, Looking Northeast.

Photograph 3. View of Pier 2, Looking Southwest.



SOUNDING PLAN

TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on September 17, 2007, the waterline was located approximately 8.6 feet below the top of the pile cap at the downstream end of Pier 1. This corresponds with a waterline elevation of 964.2 based on the previous report dated October 30, 2002.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The channel bottom consisted of silty sand with up to 12 inches of probe rod penetration.

(2) A minor accumulation of branchy timber debris, with pieces up to 3 inches in diameter, along with some minor steel debris was observed on the channel bottom at the upstream end of Pier 1 and extending along the north side of the pier.

(3) Minor accumulations of branchy timber debris were observed all around Pier 2 with a moderate accumulation of larger timber debris, with pieces up to 12 inches in diameter, observed at the downstream end of the pier.

(4) The concrete pier cap exhibited timber formwork embedded into the south face of Pier 1 with an area of concrete section loss observed along the formwork which was 2.5 feet long, 1 foot wide, and 4 inches deep.

(5) A large area of slop concrete was observed on the channel bottom along the center portion of Pier 1.

(6) The west embankment was well armored with riprap up to 3 feet in diameter.

(7) Scour depression 3 feet radius by 1 foot deep observed at the upstream end of Pier 2. It extended from upstream end to the downstream 1/4 point on the south side and the midpoint on the north side.

(8) Scour depression 3 feet radius by 1 foot deep was observed at downstream end of Pier 1.

Legend

-2.0 / -5.2	Sounding Depth (9/17/07) / Sounding Depth (10/30/02)
	Concrete-Filled Steel Shell Pile (under cap)
	Battered Concrete-Filled Steel Shell Pile (under cap)
	Timber Debris

Note:

All soundings based on 2007 waterline location.

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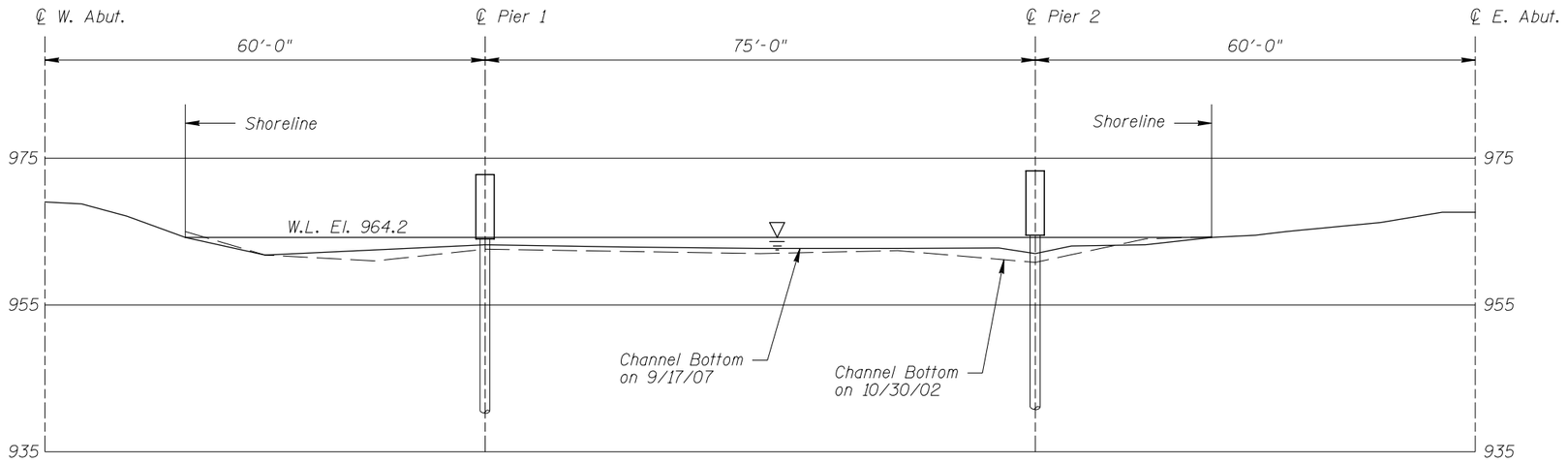
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

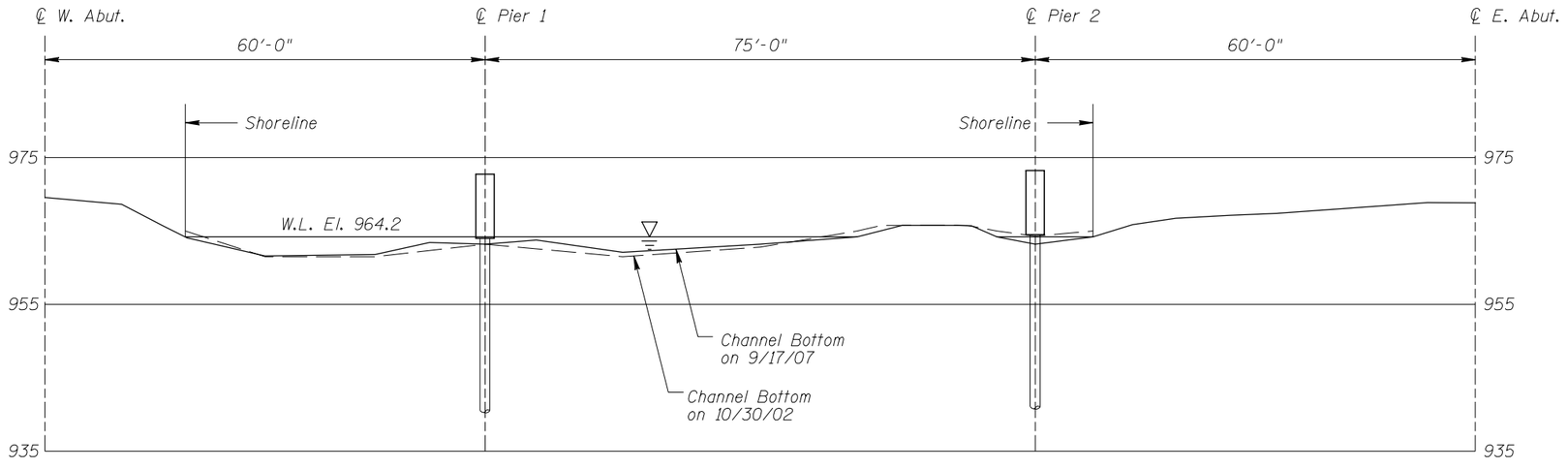
STRUCTURE NO. 84505
OVER OTTER TAIL RIVER
DISTRICT 4, WILKIN COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCT. 2007
Checked By: MDK		Scale: NTS
Code: 52210058		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

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UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCT. 2007
Checked By: MDK		Scale: 1"=20'
Code: 52210058		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: September 17, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 84505 WEATHER: Cloudy, 62°F

WATERWAY CROSSED: Otter Tail River

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

OTHER _____

PERSONNEL: Denis Redzic, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera

TIME IN WATER: 1:40 p.m.

TIME OUT OF WATER: 2:20 p.m.

WATERWAY DATA: VELOCITY 2.0 f.p.s.

VISIBILITY 2.0 foot

DEPTH 2.5 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the concrete and steel surfaces of the piers were found to be in good condition with no structurally significant defects observed. Minor accumulations of branchy timber debris were observed around both piers with a moderate accumulation at the downstream end of Pier 2. An area of section loss was observed on Pier 1 where timber formwork was embedded into the face of the concrete pier cap. Scour depressions 3 feet in radius and 1 foot deep were observed at the downstream end Pier 1 and the upstream end of Pier 2. However, the channel bottom appeared stable with no appreciable changes since the previous inspection.

FURTHER ACTION NEEDED: _____ YES X NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 84505
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
WATERWAY CROSSED Otter Tail River

INSPECTION DATE September 17, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	1.5’	8	7	N	9	N	7	7	8	8	8	7	7	8	N	8	N	N
	Pier 2	2.5’	8	7	N	9	N	7	7	7	7	7	7	7	8	N	8	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete and steel surfaces of the piers were found to be in good condition with no structurally significant defects observed. Minor accumulations of branchy timber debris were observed around both piers with a moderate accumulation at the downstream end of Pier 2. An area of section loss was observed on Pier 1 where timber formwork was embedded into the face of the concrete pier cap. Scour depressions 3 feet in radius and 1 foot deep were observed at the downstream end Pier 1 and the upstream end of Pier 2. However, the channel bottom appeared stable with no appreciable changes since the previous inspection.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.